

Service Manual

Audio Timer
TE902,903
(Fluorescent)

Specification

Power source: 120V AC, 220V AC, 240V AC
50/60 Hz

Power consumption: 8 W

Power capacity: 400 W

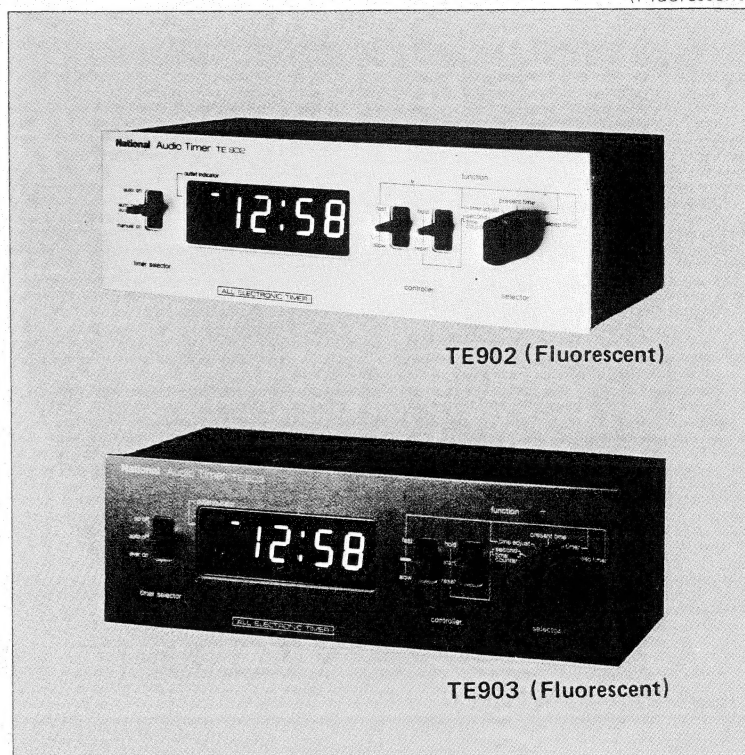
Clock accuracy: Synchronizes with AC power frequency

Timer accuracy: +0.02 second against preset time

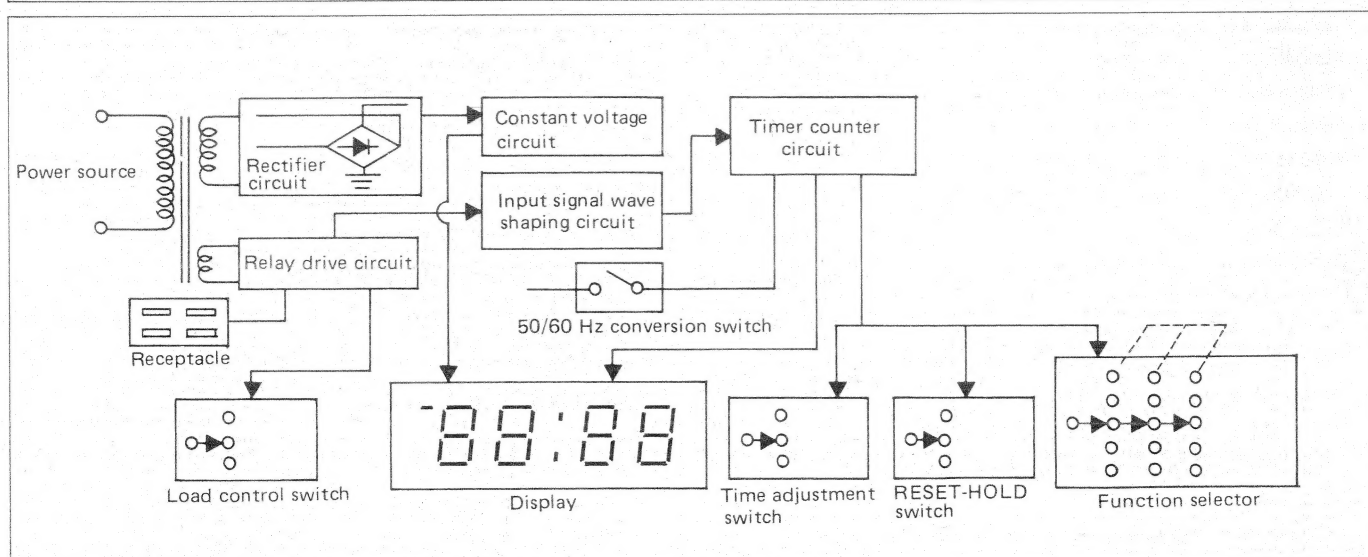
Functions: Automatic ON
Automatic ON and 59 minutes later OFF
Sleep timer (1 – 59 minutes)
Time counter

Dimensions: 88 x 250 x 137 mm

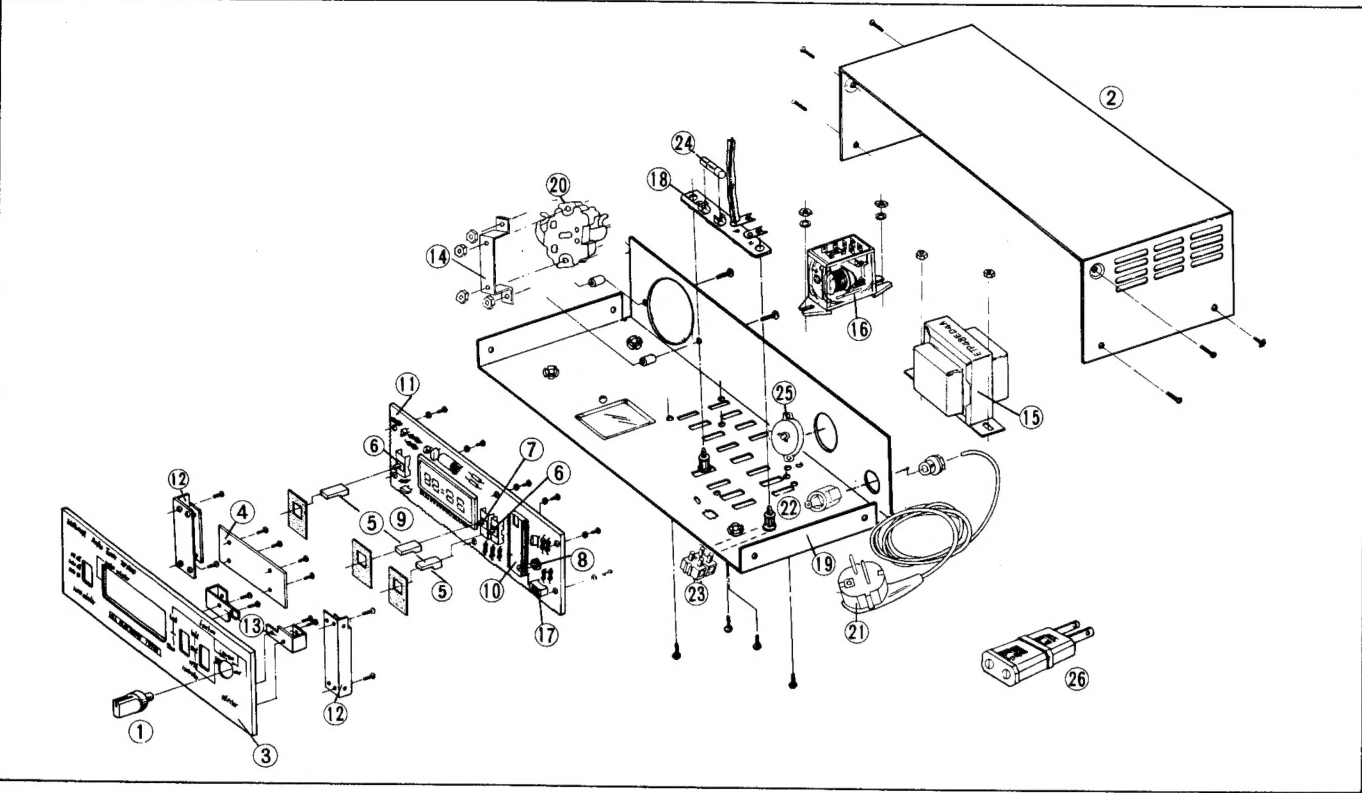
Weight: 2,080 g



BLOCK DIAGRAM



DISMANTLED VIEW



REPLACEMENT PARTS LIST





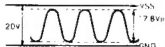
Ref. No.	Part No.	Part Name & Description	Per set			Ref. No.	Part No.	Part Name & Description	Per set		
1	TE90303597	Switch knob	1			19	TE90303098E	Lower case D (Netherlands only)	1		
2	TE90303087A	Upper case (w/o diagram)	1				TE90303098J	Lower case E (Denmark only)	1		
3	TE90303068	Front panel	1				TE90302507	Receptacle A (A2)	1		
	TE90203068	Front panel (TE902 only)	1				TE90302507B	Receptacle B (England only)	2		
4	TE90303108	Display cover	1			20	TE90302507E	Receptacle C (Denmark only)	1		
5	TE90303607	Switch lever	3				TE90302507F	Receptacle D (Netherlands only)	1		
6	TE90302597	Lever switch A	2				TE90302507G	Receptacle E (PX only)	1		
7	TE90302607	Lever switch B	1				TE90302057	Cord A (A2)	1		
8	TE90302617	Rotary switch	1				TE90302057A	Cord B (B2)	1		
9	TE93002367	Display (fluorescent)	1			21	TE90302057B	Cord C (England only)	1		
10	TE93002377	LSI	1				TE90302057E	Cord D (Denmark only)	1		
11	TE90302107	Printed circuit base	1				TE90302057F	Cord E (Netherland only)	1		
12	TE90300797	Bracket A	2				TE90302057G	Cord F (PX only)	1		
13	TE90300807	Bracket B	2			22	TE90300357A	Bushing	1		
14	TE90300807A	Bracket C (for C2 receptacle)	1			23	TE90303588A	Terminal	1		
	TE90300807B	Bracket D (Denmark only)	1			24	TE90300317A	Fuse (160mA)	1		
15	TE90302231	Transformer A (100 – 110V)	1			25	TE90302017A	Voltage conversion switch (PX only)	1		
	TE90302231D	Transformer B (120/220/240V)	1			26	TE90302217A	Adapter sets (PX only)	1		
16	TE90305308	Relay	1				TE90308107A	Operating instruction A (English)	1		
17	TE90302647	Frequency conversion switch (PX only)	1			27	TE90308107B	Operating instruction B (German)	1		
18	TE90302638	Fuse holder base	1				TE90308107C	Operating instruction C (French)	1		
	TE90303098	Lower case A (w/receptacle A2 hole)	1				TE90308107G	Operating instruction D (PX)	1		
19	TE90303098B	Lower case B (England only)	1			28	TE90308007A	Individual box	1		
	TE90303098C	Lower case C (PX only)	1			Note: Printed circuit board includes No. 9 and No. 10					

TROUBLESHOOTING CHECKLIST

Inspection and maintenance procedure

Symptom	Cause	Method of correction	Check point			
Timer display related	No light at all	Blown fuse	Replace fuse	Check for short in wiring		
		Open power cord	Replace power cord	Check for open in power cord		
		Display tube is cracked or broken	Replace display tube or printed circuit base	Check for damage to display tube		
		Open transformer	Replace transformer	Check both primary and secondary of transformer		
		Defective transformer lead soldering	Repair soldering	Check soldering		
	There are segments with no light	Open pattern	Correct pattern	Check for open circuit		
		Bad soldering on LSI display tube lead	Correct soldering	Check soldering		
		Defective LSI	Replace LSI or printed circuit base	Check LSI output		
	Unnecessary segment lighted, light leakage	Defective display tube	Replace display tube or printed circuit base	Check constant voltage		
		Display tube terminals touch	Replace display tube or printed circuit base	Check for short of display tube terminals		
	Segment is weakly lit	Defective LSI	Replace LSI or printed circuit base	Circuit inspection Check LSI output		
		Defective display tube	Replace display tube or printed circuit base	Check constant voltage		
	Segment is speckled	Defective LSI	Replace LSI or printed circuit base	Check constant voltage, EBB voltage or Zener diode voltage.		
		Defective display tube	Replace display tube or printed circuit base	Check constant voltage.		
	Entire segment is lit	Defective LSI	Change LSI or printed circuit base	Check LSI output		
	Clock related	Clock advances	Defective LSI	Replace LSI or printed circuit base	This is the case of continuous output at each segment.	
			Frequency fluctuation	Obtain automatic frequency corrector from power company	Check for increased error	
		Wrong frequency	Correct selector switch position	Check position of selector switch		
Clock runs slow		Frequency fluctuation	Replace Zener diode or printed circuit base B	Check for increased error		
		Wrong frequency	Correct selector switch position	Check selector switch position		
The flashing second indicator does not light		Defective LSI	Change LSI or printed circuit base	Check 39 pin LSI output		
The flashing second indicator remains lit		Defective LSI	Change LSI or printed circuit base	Check 39 pin LSI output		
		Defective lead soldering	Repair soldering	Check soldering		
Second signal is not transmitted		R1, R10 resistance values are not rated value	Replace printed circuit base	Check resistance value		
		C3 capacity is not rated value	Replace printed circuit base	Check condenser capacity		
Clock does not operate at all, quick advance has no effect		Defective LSI	Change LSI and printed circuit base A	Check wave form of input circuit		
Timer related		When set time ON does not function	Open relay coil	Change relay	Check coil continuity	
			Defective LSI	Change LSI or printed circuit base	Check 35 pin or 27 pin output	
			Pattern around relay open	Correct relay pattern	Visual check	
		Current flow indicator lights even though set time is not reached	(Relay does not operate)	T2 transistor defective	Replace printed circuit base	Using a continuity checker, check continuity between emitter and collector. If the needle vibrates the transistor is defective.
			(Relay operates continuously)	T1 transistor defective	Replace printed circuit base	
			Defective LSI	Change LSI or printed circuit base	Check 25 pin or 27 pin LSI output	
Clock manipulation related		Without quick advance at normal condition, clock advances continuously	Defective LSI	Change LSI or printed circuit base	Check input voltage of 34 pin LSI	
	Defective SW3		Change SW3	Check SW		
	Slow advance is not effective	Defective LSI	Change LSI or printed circuit base	Check input voltage of 33 pin LSI		
		Defective SW3	Change SW3	Check SW3		



Condition	Test location	Test item	Oscilloscope – Digital meter		Normal voltage and wave form		Interpretation of measurement and malfunction location
			Probe	Ground			
No segment lighting at all	(A)	(A) Transformer secondary voltage Filament voltage VSS	(Digital meter) (d)	(Digital meter) (a)	2.9V AC Relay OFF condition 20V DC		No output voltage at VSS • Defective transformer • Defective lead soldering • Open circuit in copper foil pattern
Some segments do not light Segment lighting is weak Segment lighting flickers Timer does not switch power ON at set time	(B)	(B) LSI output wave form	(1)~(22)	(a)	Segment (No light condition) 	Segment (Lighting condition) 	In lighting condition, no output voltage • Defective LSI In lighting condition, LSI has output • Defective display unit • Open relay coil • Open relay circuit pattern • Defective LSI
Improper segment lights Light leakage exists	(B)		(25)(27)	(a)	Compare with timer OFF condition wave form	Compare with timer ON condition wave form	No light condition with voltage output • Defective LSI No light condition with no voltage output • Defective display unit
Second indicator does not flash Second indicator flashes continuously	(C)	(C) LSI output wave form	(39)	(a)	Second indicator not flashing 	Lighting 	LSI 39 pin output: does it match wave form at left at 1 Hz? With no output, LSI is defective
Second signal is not transmitted Clock does not operate Fast advance does not help	(D)	(D) LSI output wave form	(35)	(a)			The voltage difference between VSS and Vp-p wave forms should not be excessive. When there is no wave form: • Open circuit in copper foil pattern • Defective transformer lead soldering • R1 (resistor) is defective or soldering is defective